

technical reference manual

product description **hp** vectra xe310 series 2

hp desktop pcs

www.hp.com/go/vectrasupport

hp® invent

Notice

The information contained in this document is subject to change without notice.

Hewlett-Packard makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Hewlett-Packard shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

This document contains proprietary information that is protected by copyright. All rights are reserved. No part of this document may be photocopied, reproduced, or translated to another language without the prior written consent of Hewlett-Packard Company.

Symbios® is a registered trademark of LSI Logic Corporation.

Adobe® and Acrobat® are registered trademarks of Adobe Systems Incorporated.
Microsoft®, MS-DOS®, Windows® and Windows NT® are U.S registered trademarks of Microsoft Corporation.

WOL™ (Wake on LAN) is a trademark of IBM Corporation.

Celeron™ is a trademark and Intel® and Pentium® are registered trademarks of Intel Corporation.

Adaptec® is a trademark of Adaptec Incorporated.

Analog Devices is a trademark of Analog Devices, Inc.

HP France
Business Desktop Division
38053 Grenoble Cedex 9
France

© 2001 Hewlett-Packard Company

How to Recognize Your HP Vectra XE310 Model and Series

There are two versions of the HP Vectra XE310 PC: the HP Vectra XE310 and HP Vectra XE310 Series 2.

If you are uncertain of which HP XE310 model and series you have, this information can be found on the label on the side of the PC case, as shown here.



This manual provides information about the HP Vectra XE310 Series 2 only.

Information Roadmap

Use the icon in Acrobat Reader to search for information in this PDF.

The following types of information are available for HP Business PCs:

Technical Reference

See the *HP Technical Reference Manual*.

This *Technical Reference Manual* is a technical reference and BIOS document for personnel providing system level support. It is available in PDF format on the HP support web site (**www.hp.com/go/vectrasupport**)
It is presented in modular form to provide quick and easy access to technical information on the HP Business PC. It is made up of the following components:

- The *Introduction & HP Business PC Overview* provides a quick reference guide to the hardware components and BIOS used in the latest HP Business PCs. It also lists some of the available accessories.
- *Product Description* (this document). Provides technical information specific to a HP Business PC. This includes summary information on product hardware and detailed information on the BIOS. Read this manual to see which hardware components are in the PC.
- *HP Business PC Technology.* Provides an in-depth guide to the hardware in all of the featured HP Business PCs. Subjects covered include chipsets, processors, graphics controllers, hard disk drives and optical drives.

Installing, Configuring and Upgrading



See the *HP Service Handbook Chapter* or the *HP Upgrade Guide*.

The *Service Handbook Chapter*, available in PDF format on the HP support web site (**www.hp.com/go/vectrasupport**), provides information on:

- HP Business PC configurations
- Replacement parts
- Available accessories.

The *Upgrade Guide* will help you upgrade and replace components in your HP Business PC, including the hard drive, memory, battery, power supply, and 5.25-inch drives. More information is available on the HP support web site (**www.hp.com/go/vectrasupport**).

Troubleshooting



See the *HP Troubleshooting Guide*.

The *Troubleshooting Guide*, available in PDF format on the HP support web site (**www.hp.com/go/vectrasupport**) will help you:

- Troubleshoot your HP Business PC
- Find out where to get more information.

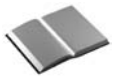
Discover and use your product

See the *HP Quick Start* card and *HP Quick User's Guide*.



The *Quick Start* card provided with your HP Business PC will help you:

- Set up and begin using your HP Business PC for the first time
- Upgrade and replace components in your HP Business PC, including the hard drive, processor memory, add-on cards and 5.25-inch drives. More information is available on the HP support web site (**www.hp.com/go/vectrasupport**).
- Find out where to get more information.



The *Quick User's Guide* provided with your HP Business PC includes basic troubleshooting information, technical specifications, warranty and legal information.

Your computer's online information



Your computer may contain online help information on the hard disk. It includes information on:

- Troubleshooting and how to use HP Instant Support
- Linking to useful HP web sites.

Information on the hp support web site



Refer to the HP support web site (**`www.hp.com/go/vectrasupport`**) for a wide range of information, including:

- Downloadable documentation
- Service and support options
- The latest BIOS, drivers and utilities
- Answers to Frequently Asked Questions.

System recovery cd-roms



Used for a full system recovery or alternative OS installation. Includes instructions on how to recover your preloaded software including operating system, drivers and utilities.

Finding Information

Use the following table to determine where to locate particular types of information:

Type of Information	Location
• Support phone numbers • Technical support contact information • Warranty information	*Quick User's Guide*
• How to set it up	*Quick Start Card* (details) *Quick User's Guide* (general information)
• Operation	Operating system and application manuals
• Diagrams and detailed instructions on installing add-on devices • Internal wire connections for adding hard drives, CD-ROM, etc. • Memory expansion and replacing devices	*Upgrade Guide*
• LAN configuration • LAN controller	*Technical Reference Manual*
• Identifying the problem • Information on errors • Problem solving • Troubleshooting	*Troubleshooting Guide*
• Parts list • Accessories list	*Service Handbook Chapter*
• BIOS • Connectors • IRQ • POST setup • Specifications • System board layout • Technical diagrams	*Technical Reference Manual*

Bibliography

Datasheets and other information can be obtained at:

- *Intel Chipsets*
  developer.intel.com
- *Intel Dynamic Video Memory Technology*
  www.developer.intel.com/business/products/chipsets/dvmt_white.pdf
- *Celeron and Pentium III Processors*
  www.intel.com/celeron/
  www.intel.com/pentiumIII/
- *Analog Devices AD1885*
  www.analogdevices.com
- *Intel LAN card*
  www.intel.com/support/network
- Hewlett-Packard white papers are available on a variety of subjects including AGP graphics and SDRAM memory at:
  www.hp.com/go/library

How to Recognize Your HP Vectra XE310 Model and Series 3

Information Roadmap 3

Finding Information 5

Bibliography 6

System Overview

Package Features 10

Specifications 12

System Features

XE310 Series 2 System Board Layout 14

Mass Storage Devices 17

Graphics 20

Audio 22

Network 23

Modems 24

BIOS Overview

BIOS Summary 26

Power Saving and Ergonometry 28

BIOS Addresses 29

Order in Which the POST Tests are Performed. 32

Beep Codes 37

Drivers and Software

Drivers 40

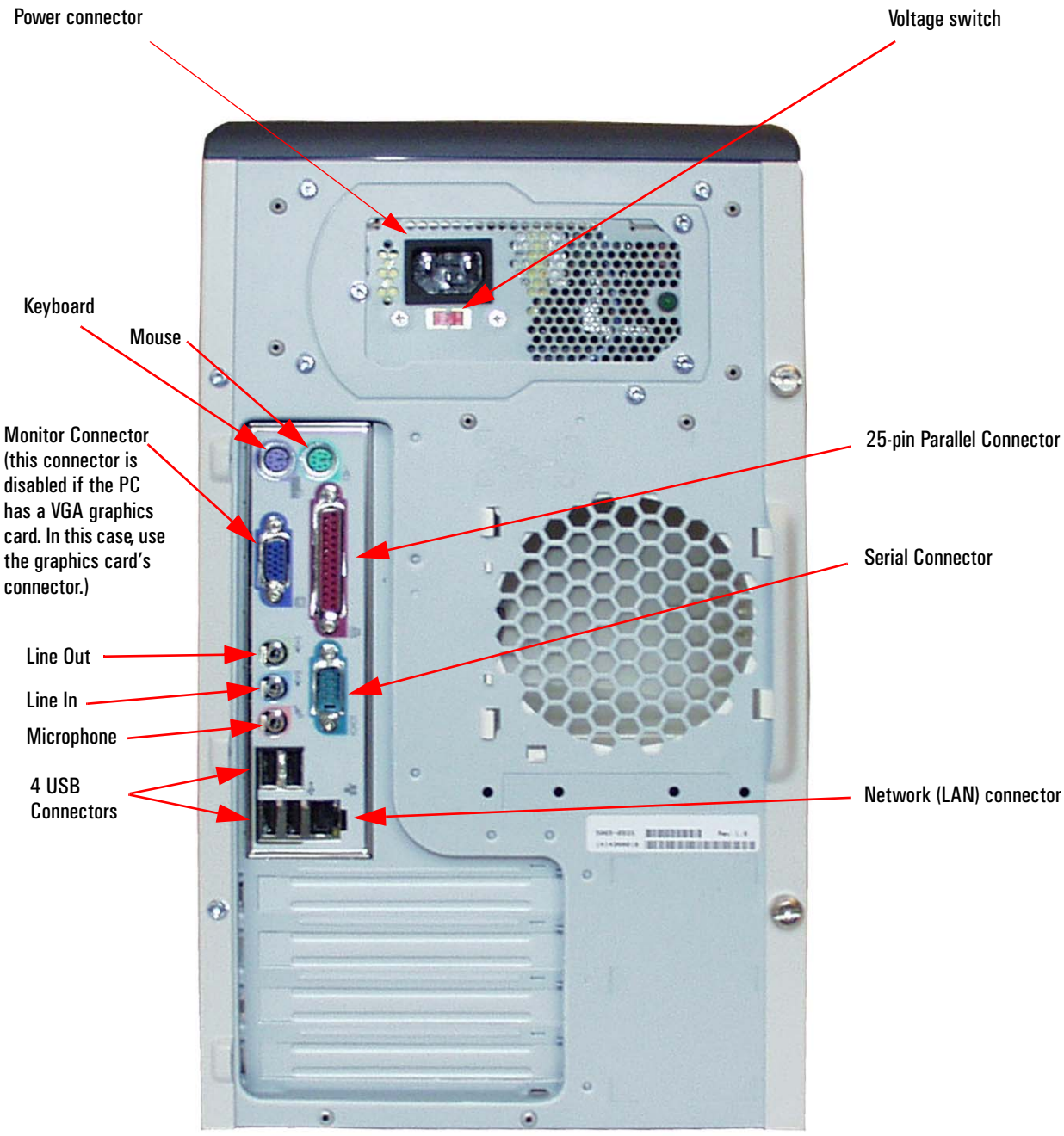
1

System Overview

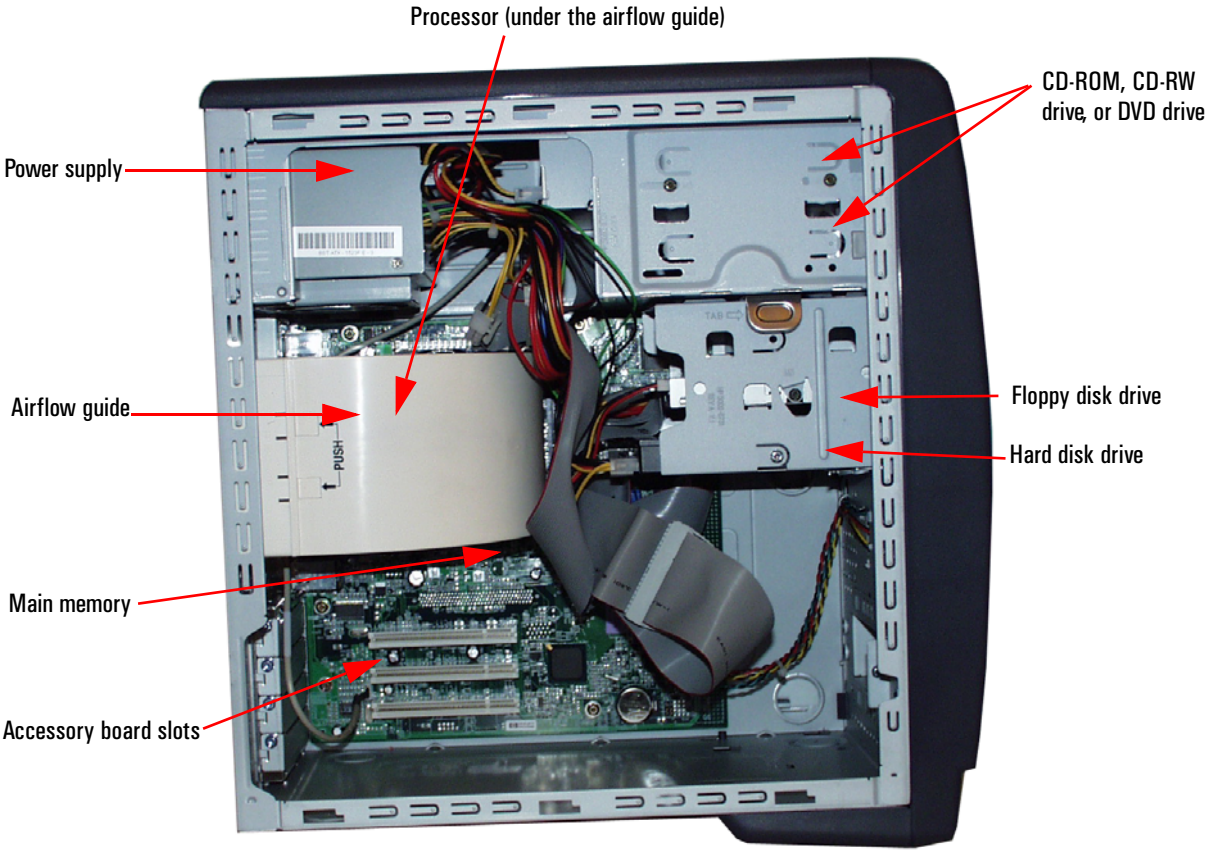
This chapter introduces the internal and external features, and lists the specifications of HP Vectra XE310 Series 2 PCs.

Package Features

Rear Connectors



Inside the Computer



Front Panel



Specifications

Physical Characteristics

Vectra XE310 Characteristics	
Weight (configuration with 1 CD-ROM drive, excluding keyboard and display)	10 kilograms (22 pounds)
Dimensions	38.0 cm (Depth) by 21.0 cm (Width) by 39.0 cm (Height) (14.96 inches by 8.27 inches by 15.35 inches)
Footprint	0.068 m^2 (0.73 sq ft)
Acoustic noise emission (ISO 7779) Operating (idle)	Sound pressure level at operator position LpA ≤ 35 dBA
Power Supply Input voltage (voltage selection switch): Input frequency:	 100-127 V 4A, 200-240 V 2A 50/60Hz
Power consumption (115 / 60Hz and 230 / 50 Hz) Max Operating Suspend Off	Windows XP 62W 40W ≤ 5W ≤ 5W
Available minimum output power	149W
Storage Humidity	8% - 85% (relative)

NOTE Operating temperature and humidity ranges may vary depending on the mass storage devices installed. High humidity levels can cause improper operation of disk drives. Low humidity ranges can aggravate static electricity problems and cause excessive wear of the disk surface.
The power consumption and acoustics figures given in the tables above are valid for the standard configuration as shipped. For more information, refer to the product's data sheet at HP's web site: **www.hp.com/desktops**.
When the computer is turned off with the power button on the front panel, the power consumption falls below 10W, but it is not zero. The special on/off method used by these computers considerably extends the lifetime of the power supply. To reach zero power consumption in "off" mode, either unplug the power outlet or use a power block with a switch.

Environmental Specifications

Environmental Specifications (System Processing Unit, with Hard Disk)	
Operating Temperature	+10°C to +35°C (+50°F to 95°F)
Storage Temperature	-40°F to +70°F (-40°C to +158°C)
Operating Humidity	15% to 80% (relative)
Storage Humidity	8% to 85% (relative), non-condensing at 40°C (104°F)
Operating Altitude	10000ft (3100m) max
Storage Altitude	15000ft (4600m) max

2

System Features

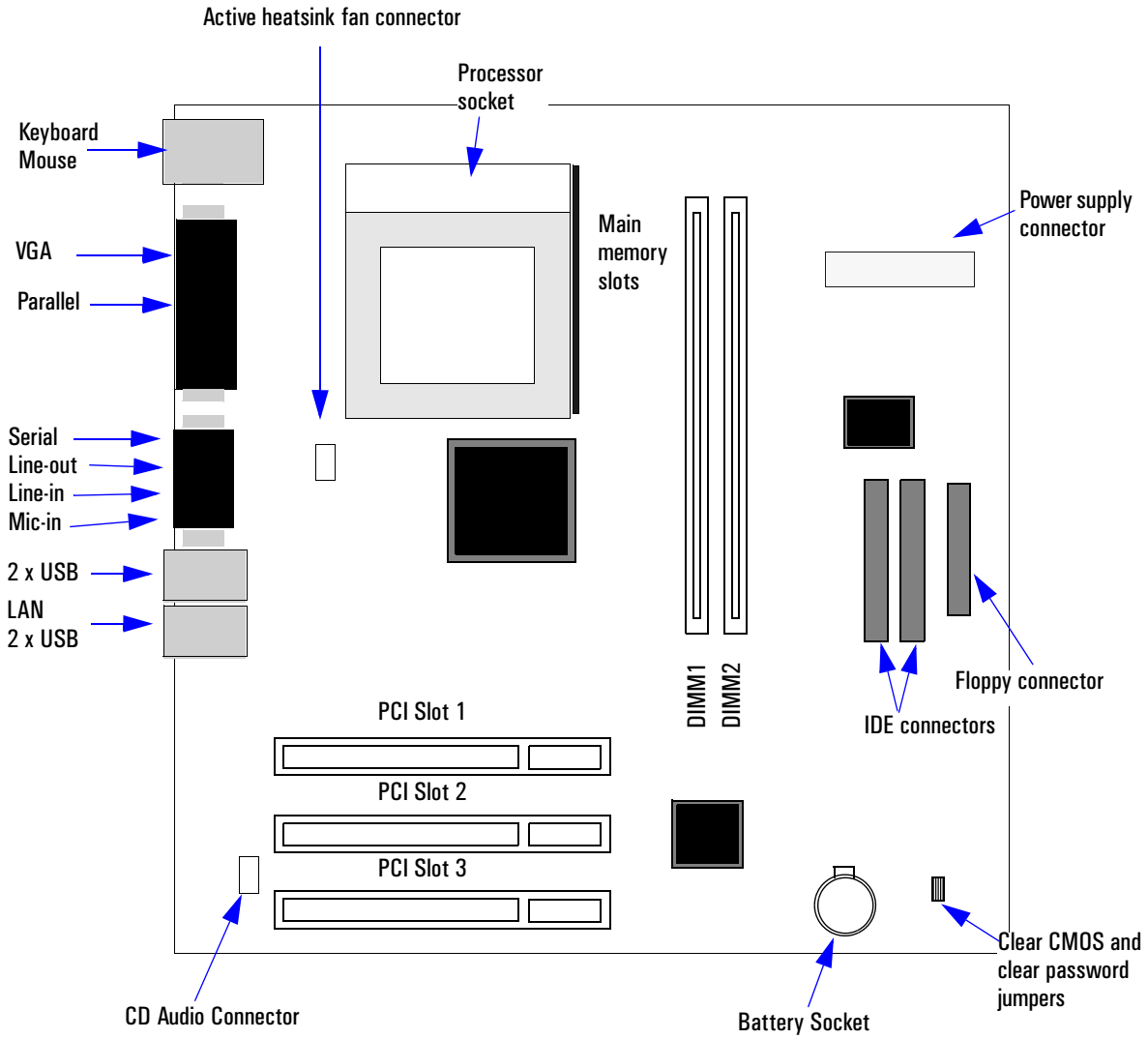
This chapter describes core components of HP Vectra XE310 Series 2 PCs such as processors, chipset, mass storage devices, graphics controllers, audio controllers, network features and input devices.

XE310 Series 2 System Board Layout

All *HP Vectra XE310 Series 2 PC* system boards have a Socket 370 for a compatible Celeron or Pentium III processor.

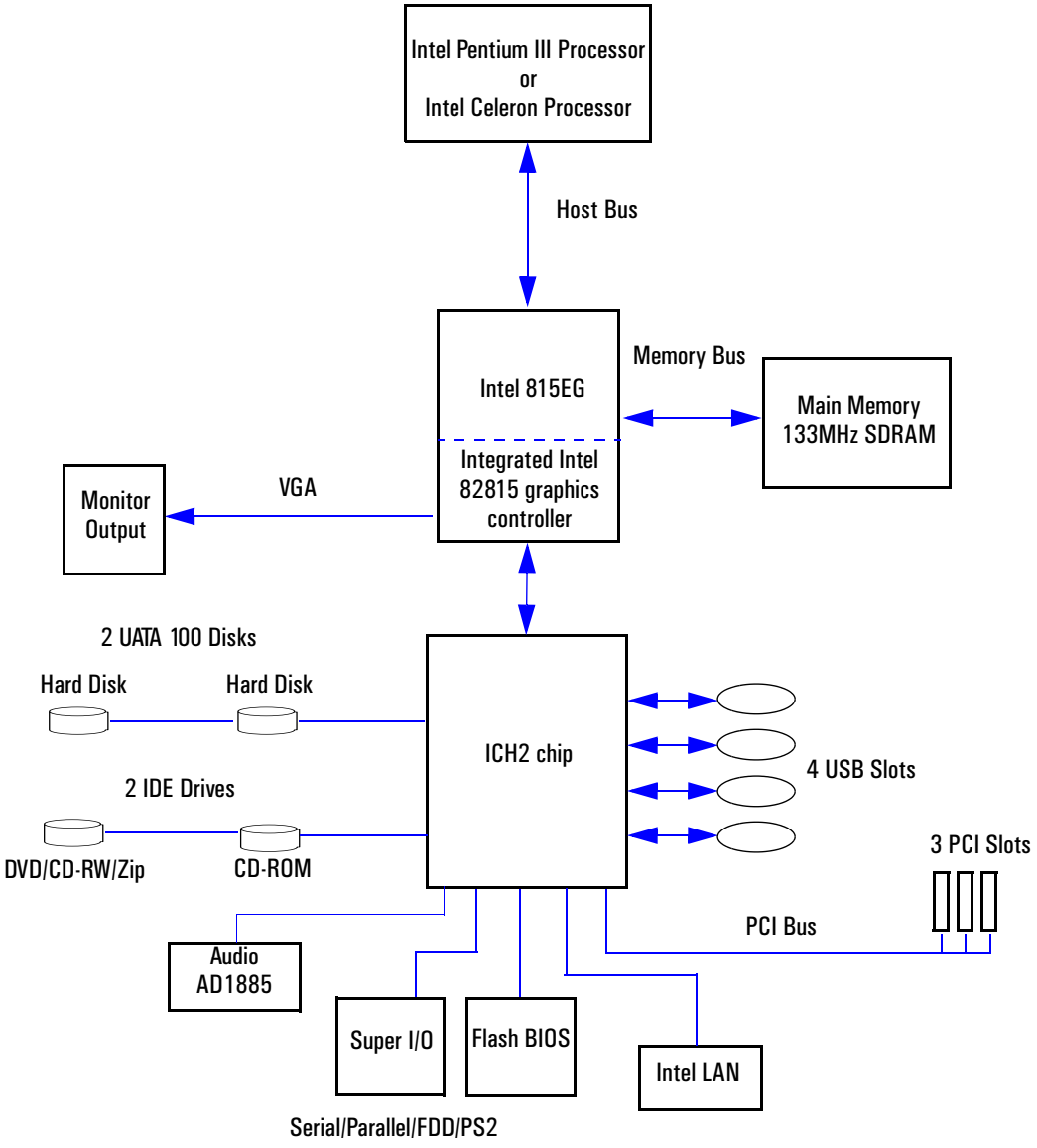
System Board Components

The following diagram shows where the different chips and connectors are located on the system board:



Architectural View

The following diagram shows the XE310 Series 2 Intel 815EG Chip architecture:



Main Memory

There are two 168-pin DIMM slots on the system board for installing main memory. You can install 133MHz SDRAM modules, these are available in 64, 128 and 256MB memory modules. You can install a maximum of 512MB (2 x 256MB modules).

You can only use non-ECC memory modules.

Processors

The XE310 Series 2 is equipped with either a single Socket 370 Intel Celeron or socket 370 Intel Pentium III processor. The processor is connected to the system board through a Plastic Pin Grid Array (PPGA) 370 Socket. A heat sink covers the processor to prevent it from overheating. The reduction in size achieved by the Socket 370 Celeron is due to the integration of the L2 cache on the processor die. Like the Celeron processor, the Pentium III comes in a 370-pin socket (PGA370) package.
To find out more about Socket 370 Celeron and Pentium III technology, refer to the *Technical Reference Manual - PC Technology*.

Accessory Board Slots

The XE310 Series 2 has three PCI accessory board slots.

PCI Slot Numbers

Your PC uses logical slot numbers in the BIOS *Setup* program. You need to know these logical slot numbers if you want to change the PCI slot configuration in the *Setup* program. PCI slot numbers are also indicated on the system board itself.

HP XE310 Series 2 PCI Mapping Table			
Bus	**Device**	**PCI Device**	**Slot#**
0	0	82815 Processor to I/O controller	
0	2	82815 Graphics controller	
0	8	ICH2: LAN controller	
0	30	ICH2: Hub interface to PCI bridge	
0	31	ICH2: PCI to LPC bridge	
0	31	ICH2: IDE controller	
0	31	ICH2: USB controller	
0	31	ICH2: SMBus controller	
0	31	ICH2: AC97 audio controller	
1	2	PCI slot 1	1
1	1	PCI slot 2	2
1	0	PCI slot 3	3

Mass Storage Devices

Hard Disk Drives

A 3.5-inch hard disk drive is supplied on an internal shelf in some models. These hard drives can be provided with the PC. To see which other hard disk drives can be purchased as accessories for the XE310 Series 2, refer to **www.hp.com/go/pcaccessories**.

	20GB Ultra-ATA 100	40GB Ultra-ATA 100
Average Seek Time (ms) **read** **write**	 9.9 10.9	 9.9 10.9
Track-to-Track Seek Time in write mode (ms)	2	2
Full Stroke Seek Time in write mode (ms)	24	24
Rotational Speed (RPM)	5400	5400
Buffer Size (KB)	2000	2000

To find out about Ultra-ATA 100 hard disk drive technology, refer to the *Technical Reference Manual - PC Technology*.

Floppy Disk Drives

All models are supplied with a 3.5-inch floppy disk drive.

Optical Drives

Models may be fitted with a 48✕ Max IDE CD-ROM drive. It can play standard CD-ROM discs, conforming to optical and mechanical standards as specified in the Red and Yellow Book. This drive can also be purchased as an accessory. Refer to **www.hp.com/go/pcaccessories**.

To find out about CD-RW and DVD drive technology, refer to *Technical Reference Manual - PC Technology*.

Features of the CD-ROM Drive (D9444A)

- CD-ROM Mode-1 data disc.
- CD-ROM Mode-2 data disc (Mode 1 and Mode 2).
- Photo-CD Multisession.
- CD Audio disc.
- Mixed mode CD-ROM disc (data and audio).
- CD-ROM XA, CD-I, CD-Extra, CD-R, CD-RW.

	Description
HP product number	D9444A
Disc Diameter	120 mm
Data Block Size	2,055 bytes (14X, Mode-1) 4,800 bytes (32X, Mode-2)
Storage Capacity	650MB (Mode-1) 742MB (Mode-2)
Sustained Transfer Rate	Outerside: 7,200KB/s Max (48X)
Burst Transfer Rate	PIO mode 4 - 16.6 Mbytes/s maximum Single Word DMA Mode 2 - 8.3MB/s maximum Multi Word DMA Mode 2 - 16.6MB/s maximum.
Access Time	Average Stroke (1 / 3) 110ms Full Stroke 180ms
Buffer Memory Size	128KB
Rotational speed	Approx. 11,100 rpm maximum

Features of the CD-RW Drive (P1543B)

	Description
HP product number	P1543B
Data Transfer Rate (1 KB = 2^{10} byte = 1,024 bytes) (1 MB = 2^{20} byte = 1,048,576 bytes)	Sustained Data Transfer Rate[1] Reading - 40x = 6,000 KB/s (Max) Writing - 16x = 2,400 KB/s (Max) (CD-R: 2400 KB/s, CD-RW: 1500 KB/s) Burst Data Transfer Rate PIO Mode 4: 16.7 MB/sec (max.) DMA Mode 2: 16.7 MB/sec (max.)
Buffer Size	2 MB
Access Time	Average Random Access Time: 95 ms (typical) Full Stroke Access Time: 180 ms (typical)
Rotational Speed	Variable (approx. 5,400 rpm max.)
Interface	IDE/ATA-2 MMC Compliant
Power Requirements	+5V and +12V 12.4W max.
Supported CD-ROM discs (120mm and 80mm discs)	CD-ROM Mode-1 data disc, CD-ROM Mode-2 data disc, CD-ROM XA, CD Audio disc, Video CD, CD-I, CD-I Ready, CD-I Bridge, CD-WO, Enhanced Music CD (CD Plus) Photo CD Multi-session
Recording Formats (120mm and 80mm discs for CD-R, 120mm only for CD-RW)	ISO 9660 UDF 1.5

1. Depends on drive specification.

Features of the DVD-ROM Drive (P1544B)

- CD-ROM Mode-1 data disc.
- CD-ROM Mode-2 data disc (Mode 1 and Mode 2).
- Photo-CD Singlesession and Multisession.
- CD Audio disc.
- Video CD.
- Mixed mode CD-ROM disc (data and audio).
- CD-ROM XA, CD-I, CD-Extra, CD-R, CD-RW, CD Text.
- DVD-ROM, DVD + RW, DVD-R, DVD-RW.

	Description
HP product number	P1544B
Disc Diameter	120mm
Storage Capacity	656MB to 18GB (depending on disk type)
Read Mode	16X max (DVD), 40X max CD-ROM
Burst Transfer Rate	PIO mode 4 - 16.6MB/s maximum Single Word DMA Mode 2 - 8.3MB/s maximum Multi Word DMA Mode 2 - 16.6MB/s maximum Ultra DMA 33 - 33.3MB/s maximum.
Access Time	CDs - Average Random Access Time: 90ms (typical) Full Stroke Access Time: 160ms (typical)
	DVDs - Average Random Access Time: 120ms (typical) Full Stroke Access Time: 180ms (typical)
Buffer Memory Size	512KB
Rotational speed	Approx. 7,300 rpm maximum

NOTE **If a disk is still in the drive after power failure or drive failure, the disk can be reclaimed by inserting a straightened paper-clip into the small hole at the bottom of the door.**

DVD Region Codes

DVD region settings can be changed up to 5 times (including the first setting).

Region Codes	Region	Supported by the P1544B DVD Drive
1	USA & Canada	Yes
2	Europe & Japan	Yes
3	South East Asia	Yes
4	Latin America & Australia	Yes
5	Russia, Rest of Asia, Africa	Yes
6	China	Yes

Graphics

Integrated Graphics Controller

The XE310 Series 2 PC uses Intel® 815EG integrated graphics with Direct AGP and Dynamic Video Memory technology. The video memory is dynamically allocated on system memory (SDRAM) by the chipset, and shared with main memory.

Depending on the configuration and application, between 4 and 10MB of main memory may be reserved for video.

Its architecture consists of dedicated multi-media engines executing in parallel to deliver high performance 3D, 2D and motion compensation video capabilities. The 3D and 2D engines are managed by a 3D/2D pipeline preprocessor allowing a sustained flow of graphics data to be rendered and displayed.

Specifications

- Integrated Graphics Controller
  - ❒ 3D Hyper Pipelined Architecture
  - ❒ Full 2D H/W Acceleration
  - ❒ Motion Video Acceleration
- 3D Graphics Visual Enhancements
  - ❒ Flat & Gouraud Shading
  - ❒ Mip Maps with Bilinear and Anisotropic Filtering
  - ❒ Fogging Atmospheric Effects
  - ❒ Z Buffering
  - ❒ 3D Pipe 2D Clipping
  - ❒ Backface Culling
- 3D Graphics Texturing Enhancements
  - ❒ Per Pixel Perspective Correction Texture Mapping
  - ❒ Texture Compositing
  - ❒ Texture Color Keying/Chroma Keying
- Display
  - ❒ Integrated 24-bit 230 MHz RAMDAC
  - ❒ Gamma Corrected Video
  - ❒ DDC2B Compliant
- 2D Graphics
  - ❒ Up to 1600x1200 in 8-bit Color at 75 Hz Refresh
  - ❒ Hardware Accelerated Functions
  - ❒ 3 Operand Raster BitBLTs
  - ❒ 64x64x3 Color Transparent Cursor
- Arithmetic Stretch Blitter Video
  - ❒ H/W Motion Compensation Assistance for S/W MPEG2 Decode
  - ❒ Software DVD at 30 fps

- ❒ H/W Overlay Engine with Bilinear Filtering
- ❒ Independent gamma correction, saturation, brightness & contrast for overlay

- Integrated Graphics Memory Controller
  - ❒ Intel®. D.V.M. Technology

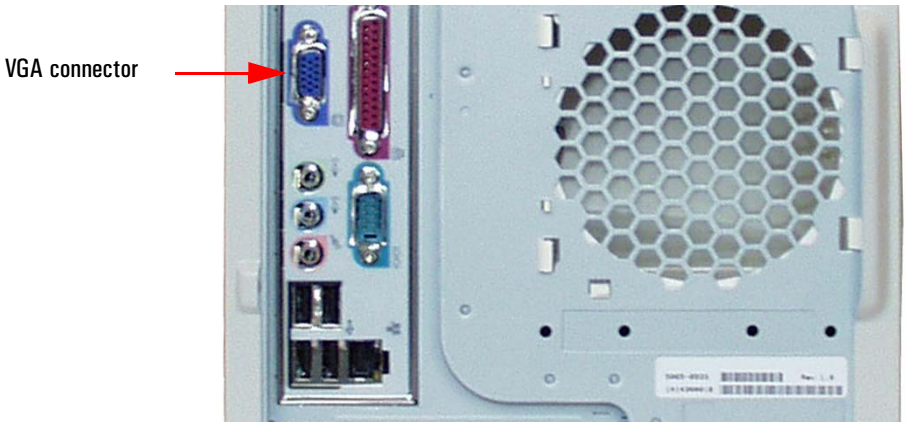
Supported resolutions

The following non-interlaced resolutions are supported for Windows XP, Windows 2000 and Windows 98, with ergonomic refresh rates up to 1280 x 1024:

Resolution	256 colors (8-bit)	64K colors (16-bit)	16.7M colors (24-bit)
640 × 480	60–100Hz	60–100Hz	60–100Hz
800 × 600	60–100Hz	60–100Hz	60–100Hz
1024 × 768	60–100Hz	60–100Hz	60–100Hz
1152 × 864	60–85Hz	60–85Hz	60–85Hz
1280 × 1024	60–85Hz	60–85Hz	60–85Hz
1600 × 1200	60–75Hz		

Connectors

A 15-pin VGA DB connector is located on the rear panel of the PC.



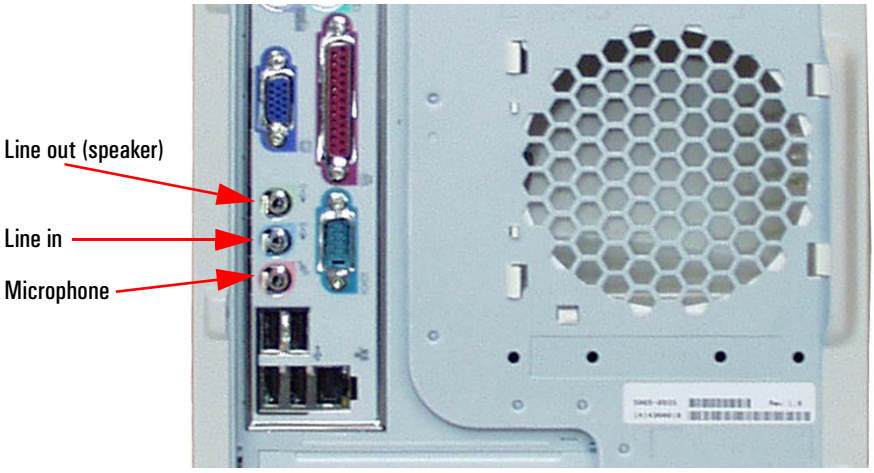
Audio

Analog Devices AD1885 Integrated AC'97

Analog Devices AD1885 AC'97 provides stereo analog I/O on the PC motherboard and peripheral devices, as part of the signal chain for delivery of high quality audio to PC-connected speakers, headphones, and microphone devices. AD1885 includes high-fidelity analog/digital, digital/analog, and sample rate converters, as well as power amplifier and programmable gain blocks.

Other features of the Analog Devices AD1885 include:

- AC'97 2.1 compatibility
- Greater than 90dB dynamic range
- Industry leading mixed signal technology
- 16-bit stereo full-duplex codec
- High quality pseudo differential CD input
- Mono microphone input with built-in 20dB pre-amplifier
- An analog line-level stereo inputs for LINE IN
- Stereo line level output
- Meets or exceeds Microsoft's PC'98, PC'99, PC'2000 audio performance requirements.



Network

All models have an integrated Intel LAN. It is possible to disable integrated LAN via the BIOS setup.

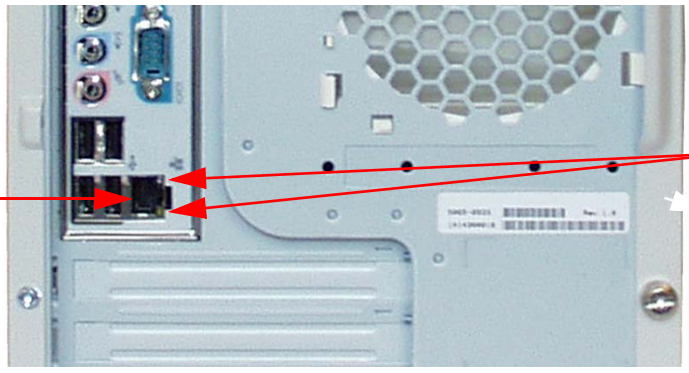
There is no Wake On LAN (WOL) connector. Support of WOL through PCI 2.2.

If you install a LAN card, integrated LAN is not automatically disabled, you can disable the integrated LAN controller in the PC's *Setup* program. For more information, refer to "Using the HP Setup Program" on page 26.

The Intel LAN boot ROM setup can be launched by pressing CTRL-S while booting your PC.

LAN connector

The 10/100BT connector is located on the rear of the HP XE310 Series 2 PC.



There are two LEDs on the 10/100BT connector as indicated in the graphic above. The following table provides a status summary of these LEDs:

LED	Description	Status		
		Flashing	On	Off
Green	Speed LED	N/A	100 Base-T connection between NIC and hub	10 Base-T connection between NIC and hub
Yellow	Link Integrity and Activity LED	Link integrity OK and network traffic present	Link integrity OK and no network traffic	No connection between NIC and hub

For more information on network technology, refer to the *Technical Reference Manual - Business PC Technology*.

Modems

HP 56K V90 PCI Internal Modem

HP 56K V90 PCI Internal Modem Features	
Data Standard (Kbps)	V. 90, K56flex, V. 34bis, V. 34, V32bis, V32, V23, V22bis, V22, Bell 212A, Bell 103
Data Compression	V. 42 bis, MNP 5
Error Correction	V. 42 LAPM, MNP 2- 4
Fax Modulations	V. 17: 14.40Kbps V. 29: 9,600bps V. 27ter: 4,800bps
Fax Control/Protocol	Class 1.0 commands, V21 Channel 2 Group 3 fax mode EIA/ TIA 578 Class 1 and T. 31
Connectors on-board	2 x RJ11 Telephone socket for Phone and Wall
Video conferencing	H. 324, ITU V. 80 video- ready modem interface

HP 56K V90 External USB e-Modem

HP 56K V90 External USB e-Modem Features	
External LED	IN USE indicator
Connector and Cable	1 × USB Series A cable 1 × RJ11 telephone socket for telephone line
Data Standard (Kbps)	V.90, V.34bis, V.34, V32bis, V32, V23, V22bis, V22, V.21
Data Compression	V.42 bis, MNP 5
Error Correction	V.42 LAPM, MNP 2-4
Fax Modulations	• V.17: 14,400 bps • V.29: 9,600 bps • V.27ter: 4,800 bps
Fax Control/Protocol	• Class 1.0 commands, V21 Channel 2 • Group 3 fax mode
Video Conferencing	ITU V.80 video-ready modem interface

3

BIOS Overview

This chapter describes the BIOS features for HP Vectra XE310 Series 2 PCs.

BIOS Summary

The HP XE310 Series 2 PC contain an HP/Phoenix BIOS. The system ROM contains the POST (power-on self-test) routines, and the BIOS: the System BIOS, video BIOS, and Intel LAN boot ROM.

The system BIOS is identified by the version number JJ.xx.yy. The latest BIOS version for your HP XE310 Series 2 PC and instructions for updating the BIOS can be downloaded from the HP's Support Web site at:
www.hp.com/go/vectrasupport

This section covers:

- The BIOS Setup program
- Power management
- BIOS addresses
- The order in which POST tests are performed
- Beep codes.

Entering the Configuration and Diagnostics menu

To enter the *Configuration and Diagnostics* menu on your HP Vectra XE310 Series 2 PC, restart the computer and press **F8** just after the computer powers-on. The *Configuration and Diagnostics* menu displays the order of devices the PC will start (boot) from; this order can be modified in the boot menu of the *Setup* program, see "Using the HP Setup Program" below.

- Press **F2** to run the *Setup* program.
- Press **Esc** to view the summary configuration screen. By default, this remains on the screen for 20 seconds, but by pressing the **Pause** key once, it can be held on the screen indefinitely until any key is pressed.
- Press **F12** to boot (start) on the network. This option will only work if your PC and the network is configured correctly.
- Press **F10** to run HP Diagnostics.

Using the HP Setup Program

In the *Configuration and Diagnostics* menu press **F2** to run the *Setup* program.

The Setup screen comprises six menus: **Main**, **Advanced**, **Security**, **Power**, **Boot** and **Exit**. These are selected using the left and right arrow keys.

Main Menu

The **Main** Menu contains the following fields:

- Date
- Time
- BIOS Version
- Drive A
- Primary Master
- Primary Slave
- Secondary Master
- Secondary Slave
- Keyboard Features
- CPU Type

- CPU Speed
- Cache RAM
- Extended Memory

Advanced Menu

The **Advanced** menu contains the following fields:

- Quick Boot Mode
- Plug and Play OS
- Reset Configuration Data
- Local Bus IDE Adapter
- Legacy USB Support
- Integrated Network Interface
- Boot on LAN
- I/O Device Configuration

Security Menu

The **Security** menu contains the following fields:

- Set User Password
- Set Supervisor Password
- Password on Boot

Power Menu

The **Power** menu contains the following field:

- State After Power Failure

Boot Menu

The **Boot** menu contains the following fields:

- Boot Device Priority
- CD-ROM Drive
- Removable Devices
- Hard Drive
- Intel Boot Agent
- HP Diagnostics

Auto detection and auto-configuration

Auto-detection and auto-configuration are essential to the ease-of-use concept. The HP BIOS avoids users having to enter *Setup* by automating many of the selection procedures:

- Conflict detection and resolution of system board, PCI, and PnP devices and their resources
- Auto-configuration and optimization of chip set based on bus speeds
- IDE HDD auto-detection, including support for IDE drives from 8.4GB to 120GB
- ATAPI CD-ROM auto-detection
- PS/2 Mouse and Keyboard detection.

Power Saving and Ergonometry

Power Management

You can reduce the PC's overall power consumption by using Power Management to slow down the PC's activity when it is idle.

Operating System Power Management

Operating systems such as Windows XP, Windows 2000 and Windows 98 SE differ in their power management capabilities. Refer to your operating system documentation for more information.

ACPI Power Management Modes

- Standby
  In Windows 2000 for example, you can enter this low power state by clicking `Start` ⇨ `Shut Down`, then selecting `Stand by` and clicking `OK`. In this mode, the LED on the PC's font panel blinks green.
- Hibernate (s4)
  This is lower power state than Standby. In Windows XP, you can enter this low power state by clicking `Start` ⇨ `Turn Off Computer`, then selecting `Hibernate` and clicking `OK`. In this mode, the LED on the PC's font panel is off.

BIOS Addresses

This section provides a summary of the main features of the HP system BIOS. This is software that provides an interface between the computer hardware and the operating system.

System Memory Map

Reserved memory used by accessory boards must be located in the area from C8000h to EFFFFh.

0000 0000 - 0000 03FF	Real-mode IDT
0000 0400 - 0000 04FF	BIOS Data Area
0000 0500 - 0009 FC00	Used by OS
0009 FC00 - 0009 FFFF	Extended BIOS Data Area
000A 0000 - 000B FFFF	Video RAM
000C 0000 - 000C 7FFF	Video ROM
000C 8000 - 000F FFFF	Adapter ROM, RAM, memory-mapped registers
000E 0000 - 000F FFFF	System BIOS (Flash/Shadow)
10 0000 - FF FFFF	Memory (1MB to 16MB)
100 0000 - 1FF FFFF	Memory (16MB to 32MB)
200 0000 -3FF FFFF	Memory (32MB to 64MB)
400 0000 -1FFF FFFF	Memory (64MB to 512MB)[1]
FFF80000 - FFFF FFFF	512KB BIOS (Flash)

1.Depending on physical memory size, the SMRAM is configured as the last 512 KB of physical memory and video memory (UMA) will be mapped in a 1 MB segment before SMRAM.

HP I/O Port Map (I/O Addresses Used by the System)

Peripheral devices, accessory devices and system controllers are accessed via the system I/O space, which is not located in system memory space. The 64KB of addressable I/O space comprises 8-bit and 16-bit registers (called I/O ports) located in the various system components. When installing an accessory board, ensure that the I/O address space selected is in the free area of the space reserved for accessory boards (100h to 3FFh).

Although the *Setup* program can be used to change some of the settings, the following address map is not completely BIOS dependent, but is determined partly by the operating system. Note that some of the I/O addresses are allocated dynamically.

I/O Address Ports	Function
0000 - 000F	DMA controller 1
0020 - 0021	Master interrupt controller (8259)
002E - 002F	NS364 Configuration registers
0040 - 0043	Timer 1
0060, 0064	Keyboard controller (reset, slow A20)
0061	Port B (speaker, NMI status and control)
0070	Bit 7: NMI mask register
0070 - 0071	RTC and CMOS data
0080	Manufacturing port (POST card)
0081 - 0083, 008F	DMA low page register
0092	PS/2 reset and Fast A20
00A0 - 00A1	Slave interrupt controller
00C0 - 00DF	DMA controller 2
00F0 - 00FF	Co-processor error
0170 - 0177	IDE secondary channel
01F0 - 01F7	IDE primary channel
0278 - 027F	LPT 2
02E8 - 02EF	Serial port 4 (COM4)
02F8 - 02FF	Serial port 2 (COM2)
0372 - 0377	IDE secondary channel, secondary floppy disk drive
0378 - 037A	LPT1
03B0 - 03DF	VGA
03E8 - 03EF	COM3
03F0h- 03F5	Floppy disk drive controller
03F6	IDE primary channel
03F7	Floppy disk drive controller
03F8 - 03FF	COM1
04D0 - 04D1	Interrupt edge/level control
0678 - 067B	LPT2 ECP
0778 - 077B	LPT1 ECP
0CF8 - 0CFF	PCI configuration space

DMA Channel Controllers

Only “I/O-to-memory” and “memory-to-I/O” transfers are allowed. “I/O-to-I/O” and “memory-to-memory” transfers are disallowed by the hardware configuration.

The system controller supports seven DMA channels, each with a page register used to extend the addressing range of the channel to 16 MB. The following table summarizes how the DMA channels are allocated.

DMA controller	
Channel	Function
0	Free
1	Free if not used for parallel port in Setup
2	Floppy disk controller
3	Free if not used for parallel port in Setup
4	Used to cascade DMA channels 0-3
5	Free
6	Free
7	Free

Interrupt Controllers

The Interrupt Requests (IRQ) are numbered sequentially, starting with the master controller, and followed by the slave.

Windows 98 SE		Windows 2000 and Windows XP	
IRQ (Interrupt Vector)	**Interrupt Request Description**	**IRQ (Interrupt Vector)**	**Interrupt Request Description**
INTR		INTR	
IRQ0	System Timer	ISA0	System Timer
IRQ1	Keyboard Controller	ISA1	Standard 101/102-Key or Microsoft Natural PS/2 keyboard
IRQ4	Used by serial port if enabled	ISA4	Communication Port (COM1)
IRQ5	Free if not used for parallel port or audio	ISA6	Standard Floppy Disk Controller
IRQ6	Floppy Disk Controller	ISA8	System CMOS/real time clock
IRQ7	LPT1	ISA9	Microsoft ACPI-Compliant System
IRQ8	RTC	ISA12	PS/2 Compatible Mouse
IRQ9	Available for PCI devices, if not used by USB port	ISA13	Numeric data processor
IRQ10	Available for PCI devices, if not used by USB port	ISA14	Primary IDE Channel
IRQ11	Available for PCI devices, if not used by USB port	ISA15	Secondary IDE Channel
IRQ12	Mouse	PCI5	Intel(R) 82801BA/BAM SMBus Controller - 2443
IRQ13	Co-processor	PCI17	Intel(R) 82801BA/BAM AC'97 Audio Controller - 2445
IRQ14	IDE Primary channel	PCI19	Intel(R) 82801BA/BAM USB Universal Host Controller - 2442
IRQ15	IDE Secondary channel. Free unless disabled	PCI20	Intel(R) PRO/100 VE Network Connection
		PCI 23	Intel(R) 82801BA/BAM USB Universal Host Controller - 2444

PCI Interrupt Request Lines

PCI devices generate interrupt requests using up to eight PCI interrupt request lines. PCI interrupts can be shared; several devices can use the same interrupt. However, optimal system performance is reached when minimizing the sharing of interrupts.

		Devices							
		PCI1	**PCI2**	**PCI3**	**AC97**	**Internal LAN**	**USB controller 1**	**USB controller 2**	**SMBus**
Chipset PCI INT lines	**PIRQA**	INTD	INTC	INTB					
	PIRQB	INTA	INTD	INTC					
	PIRQC	INTB	INTA	INTD					
	PIRQD	INTC	INTB	INTA					
	PIRQE								
	PIRQF								
	PIRQG								
	PIRQH								

Order in Which the POST Tests are Performed

Each time the system is powered on, or a reset is performed, the POST is executed. The POST process verifies the basic functionality of the system components and initializes certain system parameters.

The POST starts by displaying a graphic screen of the Hewlett-Packard logo when the PC is started.

Devices, such as memory and newly installed hard disks, are configured automatically. The user is not requested to confirm the change. Newly removed hard disks are detected, and the user is prompted to confirm the new configuration by pressing F4.

NOTE **The POST does not detect when a hard disk drive has been otherwise changed.**

During the POST, the BIOS and other ROM data is copied into high-speed shadow RAM. The shadow RAM is addressed at the same physical location as the original ROM in a manner which is completely transparent to applications. It therefore appears to behave as very fast ROM. This technique provides faster access to the system BIOS firmware.

The following table lists the POST checkpoint codes written at the start of each test.

Checkpoint Code	POST Routine Description
02h	Verify Real Mode
03h	Disable Non-Maskable Interrupt (NMI)
04h	Get CPU type
06h	Initialize system hardware
08h	Initialize chipset with initial POST values
09h	Set IN POST flag
0Ah	Initialize CPU registers
0Bh	Enable CPU cache
0Ch	Initialize caches to initial POST values
0Eh	Initialize I/O component
0Fh	Initialize the local bus IDE
10h	Initialize Power Management
11h	Load alternate registers with initial POST values
12h	Restore CPU control word during warm boot
13h	Initialize PCI Bus Mastering devices
14h	Initialize keyboard controller
17h	Initialize cache before memory autosize
18h	8254 timer initialization
1Ah	8237 DMA controller initialization
1Ch	Reset Programmable Interrupt Controller
24h	Set ES segment register to 4GB
26h	Enable A20 line
28h	Autosize DRAM
29h	Initialize POST Memory Manager

Checkpoint Code	POST Routine Description
2Ah	Clear 512KB base RAM
32h	Test CPU bus-clock frequency
33h	Initialize POST Dispatch Manager
34h	Test CMOS RAM
35h	Initialize alternate chipset registers
36h	Warm start shutdown
37h	Reinitialize the chipset (MB only)
38h	Shadow system BIOS ROM
39h	Reinitialize the cache (MB only)
3Ah	Autosize cache
3Ch	Configure advanced chipset registers
3Dh	Load alternate registers with CMOS values
40h	Set initial CPU speed
42h	Initialize interrupt vectors
44h	Initialize BIOS interrupts
45h	POST device initialization
47h	Initialize manager for PCI Option ROMs (Rel. 5.1 and earlier)
48h	Check video configuration against CMOS
49h	Initialize PCI bus and devices
4Ah	Initialize all video adapters in system
4Bh	Display QuietBoot screen
4Ch	Shadow video BIOS ROM
4Eh	Display BIOS copyright notice
50h	Display CPU type
51h	Initialize EISA board
52h	Test keyboard
54h	Set key click if enabled
56h	Enable keyboard
59h	Initialize POST display service
5Ah	Display prompt “Press F2 to enter SETUP”
5Bh	Disable CPU cache
5Ch	Test RAM between 512 and 640KB
60h	Test extended memory
62h	Test extended memory address lines
64h	Jump to UserPatch1
66h	Configure advanced cache registers
67h	Initialize Multi Processor APIC
68h	Enable external and CPU caches
69h	Setup System Management Mode (SMM) area
6Ah	Display external L2 cache size

Checkpoint Code	POST Routine Description
6Ch	Display shadow-area message
6Eh	Display possible high address for UMB recovery
70h	Display error messages
72h	Check for configuration errors
74h	Test real-time clock
76h	Check for keyboard errors
7Ah	Test for key lock on
7Ch	Set up hardware interrupt vectors
7Eh	Initialize coprocessor if present
80h	Disable onboard Super I/O ports and IRQs
81h	Late POST device initialization
82h	Detect and install external RS 232 ports
83h	Configure non-MCD IDE controllers
84h	Detect and install external parallel ports
85h	Initialize PC-compatible PnP ISA devices
86h	Re-initialize onboard I/O ports
87h	Configure Motherboard Configurable Devices
88h	Initialize BIOS Data Area
89h	Enable Non-Maskable Interrupts (NMIs)
8Ah	Initialize Extended BIOS Data Area
8Bh	Test and initialize PS/2
8Ch	Initialize floppy controller
8Fh	Determine number of ATA drives
90h	Initialize hard disk controllers
91h	Initialize local-bus hard disk controllers
92h	Jump to UsersPatch2
93h	Build MPTABLE for multi-processor boards
94h	Disable A20 address line (Rel. 5.1 and earlier)
95h	Install CD ROM for boot
96h	Clear huge ES segment register
97h	Fixup Multi Processor table
99h	Check for SMART drive
9Ah	Shadow option ROMs
9Ch	Set up Power Management
9Eh	Enable hardware interrupts
9Fh	Determine number of ATA drives
A0h	Set time of day
A2h	Check key lock
A4h	Initialize typematic rate
A8h	Erase F2 prompt

Checkpoint Code	POST Routine Description
AAh	Scan for F2 key stroke
ACh	Enter SETUP
AEh	Clear IN POST flag
B0h	Check for errors
B2h	POST done - prepare to boot operating system
B5H	Terminate QuietBoot
B6h	Check password (optional)
B8h	Clear global descriptor table
B9h	Clean up all graphics
BAh	Initialize DMI parameters
BBh	Initialize PnP Option ROMs
BCh	Clear parity checkers
BDh	Display MultiBoot menu
BEh	Clear screen optional
BFh	Check virus and backup reminders
C0h	Try to boot with INT 19
C1h	Initialize POST Error Manager (PEM)
C2h	Initialize error logging
C3h	Initialize error display function
C4h	Initialize system error handling

Checkpoint Code	POST Routine Description
The following are for boot block in Flash ROM	
E0h	Initialize the chipset
E1h	Initialize the bridge
E2h	Initialize the CPU
E3h	Initialize system timer
E4h	Initialize system I/O
E5h	Check force recovery boot
E6h	Checksum BIOS ROM
E7h	Go to BIOS
E8h	Set Huge Segment
E9h	Initialize Multi Processor
EAh	Initialize OEM special code
EBh	Initialize PIC and DMA
ECh	Initialize Memory type
EDh	Initialize Memory size
EEh	Shadow Boot Block
EFh	System memory test
F0h	Initialize interrupt vectors
F1h	Initialize Run Time Clock
F2h	Initialize video
F3h	Initialize beeper
F4h	Initialize boot
F5h	Clear Huge segment
F6h	Boot to Mini DOS
F7h	Boot to Full DOS

Beep Codes

If a terminal error occurs during POST, the system issues a beep code before attempting to display the error in the upper left corner of the screen. Beep codes are useful for identifying the error when the system is unable to display the error message.

Beep Pattern	Beep Code	Numeric Code	Description
— -- -- ---	1-2-2-3	16h	BIOS ROM check-sum failure
— --- — —	1-3-1-1	20h	DRAM refresh test failure
— --- — ---	1-3-1-3	22h	8042 Keyboard controller test failure
— --- --- —	1-3-3-1	2Ch	Autosize DRAM failure (RAM module missing or not installed correctly)
— --- ---- —	1-3-4-1	2Ch	RAM failure on address line *xxxx*[1]
— --- ---- ---	1-3-4-3	2Eh	RAM failure on data bits *xxxx*[1] of low byte of memory bus
— ---- — —	1-4-1-1	30h	RAM failure on data bits *xxxx*[1] of high byte of memory bus
-- — -- ---	2-1-2-3	46h	ROM copyright notice check failure
-- -- --- —	2-2-3-1	58h	Unexpected interrupts test failure
— --	1-2	98h	Video configuration failure or option ROMs check-sum failure
-	1	B4h	This does not indicate an error. There is one short beep before system startup.

1.If the BIOS detects error 2C or 2E (base 512K RAM error), it displays an additional word-bitmap (*xxxx*) indicating the address line or bits that failed. For example, "2C 0002" means address line 1 (bit one set) has failed. "2E 1020" means data bits 12 and 5 (bits 12 and 5 set) have failed in the lower 16 bits.

4

Drivers and Software

This chapter describes the drivers and software preloaded with HP Vectra XE310 Series 2 PCs.

Drivers

You can download up-to-date versions of drivers required for XE310 Series 2 PCs from the “Software and Drivers” section of HP’s Support web site at: **www.hp.com/go/vectrasupport**.

Software

XE310 Series 2 models come preloaded with the following software. You can download the most up-to-date versions from the “Software and Drivers” section of HP’s Support web site at: **www.hp.com/go/vectrasupport**.

Software, such as for DVD or CD-RW drives, may be provided on a separate CD-ROM.

Operating Systems

- Microsoft Windows XP Home Edition or Windows XP Professional

Software

- e-DiagTools 3.5
- HP RecordNow CD-RW software (on CD-ROM) from Veritas on selected models
- WinDVD DVD software (on CD-ROM) from InterVideo on selected models

e-DiagTools

HP e-DiagTools, the hardware diagnostics utility can help you diagnose hardware-related problems on your HP PC. For more information about this utility, refer to the e-Diagtools User's Guide. The e-Diagtools User's Guide is available on the HP Information CD-ROM for the XE310 Series 2, or on HP’s support web site (**www.hp.com/go/vectrasupport**).

e-DiagTools is installed on the Utility Partition on the PC’s hard disk drive, is provided on one of the CD-ROMs that came with the PC (HP Image Library and Diagnostics System CD-ROM), and is available on the HP e-DiagTools CD (you can order this CD-ROM from HP’s Support web site).

BIOS Updates

The system BIOS is identified by the version number **JJ.01.xx.US**. The latest BIOS version for your PC and instructions for updating the BIOS can be downloaded from the HP support Web site at: **www.hp.com/go/vectrasupport**.


invent